Amendments to the Specification:

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Figure 6 is a high-level flow chart depicting a third embodiment of a method in accordance with the present invention for forming the magnetic element and bit line in accordance with the present invention.

Figure 7 depicts another embodiment of an MRAM architecture in accordance with the present invention including bit lines that resides below the magnetic elements.

Figure 8 depicts another embodiment of an MRAM architecture in accordance with the present invention including bit lines that resides below the magnetic elements.

Figure 9 depicts an embodiment of a magnetic write line usable in an MRAM architecture in accordance with the present invention including bit lines that resides below the magnetic elements.

Figure 10 depicts an embodiment of a magnetic write line usable in an MRAM architecture in accordance with the present invention including bit lines that resides below the magnetic elements.

Figure 11 depicts an embodiment of a magnetic write line usable in an MRAM architecture in accordance with the present invention including bit lines that resides below the magnetic elements.

Figure 12 depicts an embodiment of a magnetic write line usable in an MRAM architecture in accordance with the present invention including bit lines that resides below the magnetic elements.

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Co-pending U.S. patent application Serial No. 60/431/742 entitled "MRAM MEMORIES UTILIZING MAGNETIC WRITE LINES" assigned to the assignee of the present application describes a MRAM architecture that addresses many of the issues encountered in conventional MRAM devices. Applicant hereby incorporates by reference the above-identified co-pending application. Figure 3 depicts one embodiment of a portion of an MRAM 70 including the basic structure described in the above-identified co-pending application. The MRAM 70 depicted in Figure 3 includes a magnetic element 90, which is preferably a MTJ stack 90, a selection device 81 formed in a substrate 80, a magnetic write line [[82]]83, a bit line [[83]]82, a conductive stud 87, connecting stud 96 and ground line 97. The selection device 81 is preferably a FET transistor including gate 84, source 85 and drain 86. The MTJ stack also includes the pinned layer 92 having a fixed magnetic vector (not shown), a tunneling layer 93, a free layer 94 having a changeable magnetic vector (not shown), and a conductive capping layer 95. The conductive capping layer 95 is preferably a nonmagnetic spacer layer 95. The MTJ stack includes layers (not explicitly shown) that includes seed and, preferably, antiferromagnetic layers.

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The magnetic write line 82 includes soft magnetic materials and is separated from the free layer 94 of the MTJ stack 90 by the non-magnetic spacer layer 95. In one embodiment, the write line 83 is also magnetic. The magnetic write line 82 is preferably substantially or completely composed of a soft magnetic material. In addition, at least a core, as opposed to a cladding layer, includes the soft magnetic layer. In an alternate embodiment, the magnetic write line 82 may be a laminate including one or more layers of magnetic material alternating with one or more layers of nonmagnetic material. Further, the magnetic write line 82 may be magnetic or <u>may have a</u> nonmagnetic <u>layer</u> ~~and be~~ separated from a soft magnetic layer (not shown) by an insulating layer (not shown). Due to the small spacing between the magnetic write line 82 and the free layer 94, the magnetic vector of free layer 94 is strongly coupled magnetostatically to the magnetic vector of the magnetic write line 82. Such a magnetostatic coupling promotes rotation amplitude for the free layer magnetic vector. Hence, write efficiency is improved. In addition, the write line 83 may also be magnetic in the manner described above with respect to the magnetic write line 82.

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Thus, using the methods 200, 200' and/or 250, MRAMs 100 and 100' having improved process control can be provided. In addition, the methods 200, 200' and/or 250, MRAMs 100 and 100' allow for increased processing flexibility. Furthermore, as described above, the variation in magnetic properties of the MRAMs 100 and 100' can be decreased and performance of the MRAMs 100 and 100' improved.

<u>Furthermore, Figures 7 and 8 depict alternate embodiments 100'' and 100''', respectively, of MRAM architecture in accordance with the present invention including bit lines</u>

that resides below the magnetic elements. The MRAM 100'' is analogous to the MRAM 100 and has components that are labeled analogously. However, the magnetic element 30''' has its layers reversed from the magnetic element 30' depicted in Figure 4A. In particular, the free layer 38''' resides below the dielectric layer 36'''. The pinned layer 34''' resides on the dielectric layer 36'''. In addition, the layers 32''' includes a layer of antiferromagnetic material in contact with the surface of the pinned layer 34''' to fix the direction of the magnetization in the pinned layer 34'''. In addition, seed layers (not shown) may be provided under the free layer 38'''. Similarly, the MRAM 100''' is analogous to the MRAM 100' and thus has components that are labeled analogously. However, the magnetic element 30'''' has its layers reversed from the magnetic element 30'' depicted in Figure 4A. In particular, the free layer 38'''' resides below the dielectric layer 36''''. The pinned layer 34'''' resides on the dielectric layer 36''''. In addition, the layers 32'''' include a layer of antiferromagnetic material in contact with the surface of the pinned layer 34'''' to fix the direction of the magnetization in the pinned layer 34''''. In addition, seed layers (not shown) may be provided under the free layer 38'''.

Figures 9-12 depict embodiments of magnetic lines 300, 300', 300'', and 300''' that could be used for one or more of the lines 110 and 112, 110' and 112', 110'' and 112'', and 110''' and 112''' depicted in Figures 4A, 5A, 7, and 8, respectively. The magnetic lines 300, 300', 300'', and 300''' are also analogous to the lines 82 and 83, discussed above. The magnetic line 300 is composed substantially or wholly of a soft magnetic material. Thus, a core portion of the line 300, as opposed to only a cladding, includes magnetic material. The magnetic line 300' is a laminate of layers 302, 304, 306 and 308 including magnetic layers 302 and 306 as well as nonmagnetic layers 304 and 308. The magnetic line 300'' includes a conductive layer 310 and a magnetic cladding layer 312 that is on a side not facing the MTJ stack 30'''. Finally, the

<u>magnetic line 300''' includes conductive material 314 and a magnetic cladding layer 318 separated by from the conductive material 314 by a nonmagnetic layer 316.</u>